

**Patent Claims**

1. Device for registering and reproducing sounds, in particular for acoustic component analysis in motor vehicles, thereby characterized, that at least two microphones (10, 12) are provided for locating in the vicinity of the two ears of a user (54) for the binaural collection of sounds and for the translation into electrical signals, two sound protection devices (30, 32) for providing in the vicinity of the two ears for the shielding of the two ears from the detected sounds, signal processing device (14) for real time processing or real time relaying of the produced electrical signals and two sound transducers (16, 18) for providing in the vicinity of the two ears for the binaural real time production of acoustic signals corresponding to the relayed or processed signals.
2. Device according to Claim 1, thereby characterized, that the signal processing means (14) include devices for reduction or elevating the sound level emitted by the sound transducer (16, 18) relative to the sound level collected by the two microphones (10, 12).
3. Device according to Claim 1 or 2, thereby characterized, that the signal processing means (14) includes filter means for suppressing frequency ranges of the collected sound, wherein over time steady or variable frequency ranges are suppressible.

4. Device according to Claim 3, thereby characterized, that the signal processing means (14) includes control devices for controlling the filtering devices depending upon operating parameters of a further system (22), in particular the object being examined or a motor vehicle.
5. Device according to Claim 4, thereby characterized, that the control device includes means for providing, preferably forms of artificial intelligence such as neural networks and/or fuzzy logic.
6. Device according to one of the preceding Claims, thereby characterized, that it includes data banks (24), in particular for storage of sound patterns.
7. Device according to one of the preceding Claims, thereby characterized, that the signal processing means (14) include synthesizers for production of sound patterns from the detected or sampled sounds.
8. Device according to Claim 6 or 7, thereby characterized, that the signal processing means (14) includes mixing devices for mixing in of produced sound patterns and/or stored sound patterns to the further processed or relayed signals.
9. Device according to Claim 8, thereby characterized, that the signal processing means (14) includes control devices for controlling the mixing device depending upon operating parameters of a further system (22), in particular an object being examined or a motor vehicle.

10. Device according to Claim 9, thereby characterized, that the control device includes means for presenting or reproducing, preferably forms of artificial intelligence such as neural networks and/or fuzzy logic.
11. Device according to one of the preceding Claims, thereby characterized, that at least one communication interface (26) is provided.
12. Process for collecting and reproducing sounds, in particular for acoustic component analysis in motor vehicles, thereby characterized, that the following steps are included: binaural detection of sounds in the vicinity of the two ears of a user and conversion into electrical signals with shielding of the two ears from the sounds, processing or relaying the produced electrical signals in real time and binaural production of acoustic signals in the vicinity of the two ears in real time corresponding to the relayed or processed signals.
13. Process according to Claim 12, thereby characterized, that in the real time processing a filtering for suppression of time constant and/or variable frequency ranges is provided.
14. Process according to Claim 13, thereby characterized, that the filtering occurs depending upon operating parameters of a further system (22), in particular an examined object or vehicle.

15. Process according to Claim 13 or 14, thereby characterized, that the filtering occurs under employment of artificial intelligence, in particular neural network and/or fuzzy logic.
16. Process according to one of the preceding Claims, thereby characterized, that a synthesizing of sound patterns out of detected sounds is provided.
17. Process according to Claim 16, thereby characterized, that the mixing of detected, synthesized and/or stored sound patterns is provided.
18. Process according to Claim 17, thereby characterized, that the mixing occurs depending upon operating parameters of a further system (22), in particular an object being examined or a motor vehicle.
19. Process according to Claim 18, thereby characterized, that the mixing occurs with employment of artificial intelligence, in particular neural network and/or fuzzy logic.
20. Process according to one of the preceding claims, thereby characterized, that a data exchange and/or a communication with a further system occurs.
21. Headphones, in particular for employment in the device and with the process according to one of the preceding claims, with two shield casings (30, 32) for human ears

and respectively at least one acoustic transducer (16, 18) in each shield casing (30, 32), thereby characterized, that at least one microphone (10, 12) is provided on the outside of each shield casing (30, 32) on the side opposite to the ear.

22. Headphones according to Claim 21, thereby characterized, that the attenuation of interfering external sound is supported by the shield casings in the low frequency range by methods of destructive interference.
23. Headphones according to Claims 21 or 22, thereby characterized, that on the outside of each shield casing (30, 32) on the side opposite to the ear a simulation (36, 38) of a human ear is provided, in the vicinity of which the microphone (10, 12) is provided.